Burnthrough Test Hardware Setup Procedure

Summary

The purpose of these tools and corresponding procedures is to aid in making the burner setup, as well as the relationship between the burner and test article, as consistent as possible between participating laboratories.

General Notes:

- Prior to any adjustment, ensure that all internal components are correct (stator, fan, turbulator, nozzle).
- Dipstick markings are reference only.
- Burner cone face, insulation frame, thermocouple rakes, and calorimeter face are 30 degrees as measured from vertical.
- Reference point for clocking measurement is the center point between the two ignitors.
- Remove any pins that restrain the turbulator to the draft tube. Achieve lockdown via setscrew installed in draft tube, or temporarily using silicone sealant.
- In order to achieve the correct air velocity readings, all flanges should be sealed with high-temp silicone to prevent air leakage (ignitor box, rear face plate, airbox).

Location of Burner Cone; Depth and Clocking of Internal Components

- Set burner cone protrusion. Check with straightedge across burner cone face both horizontally and vertically. See Figure 1.

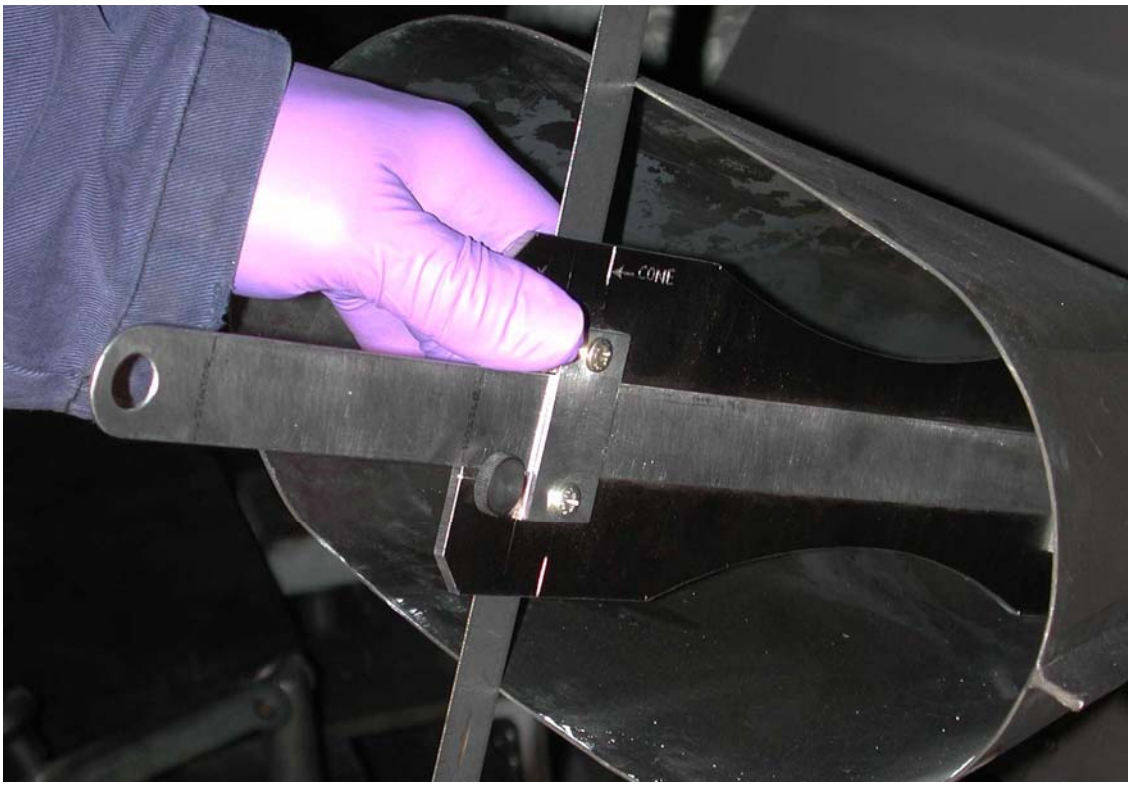

Figure 1: Setting Burner Cone Protrusion

- Using dipstick, adjust fuel nozzle depth. See Figure 2.

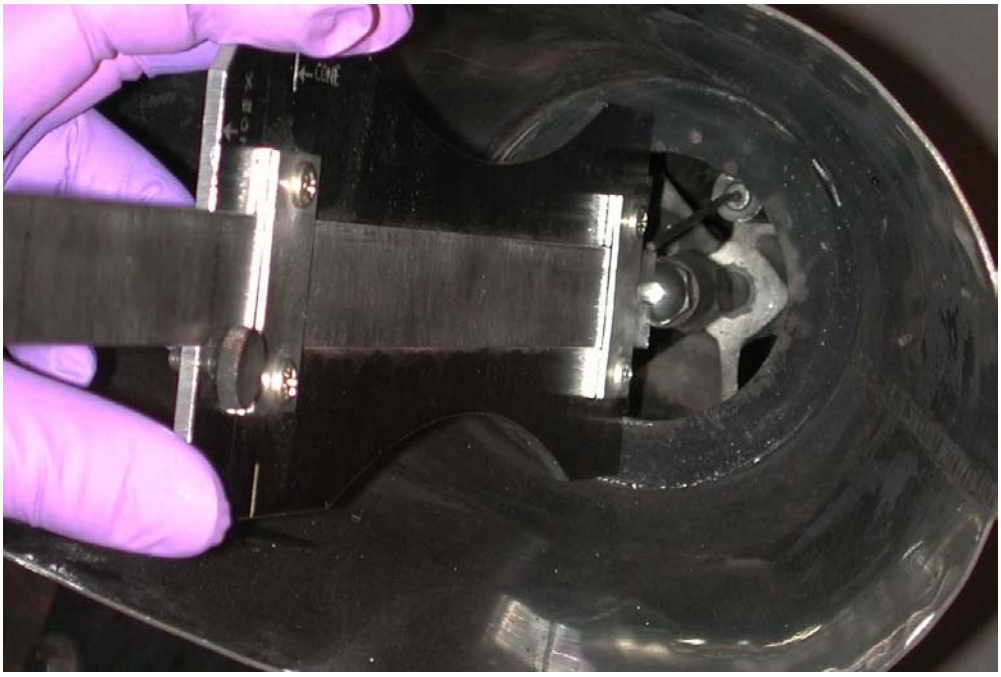

Figure 2: Setting Fuel Nozzle Depth

- Using dipstick, adjust stator depth. See Figure 3.

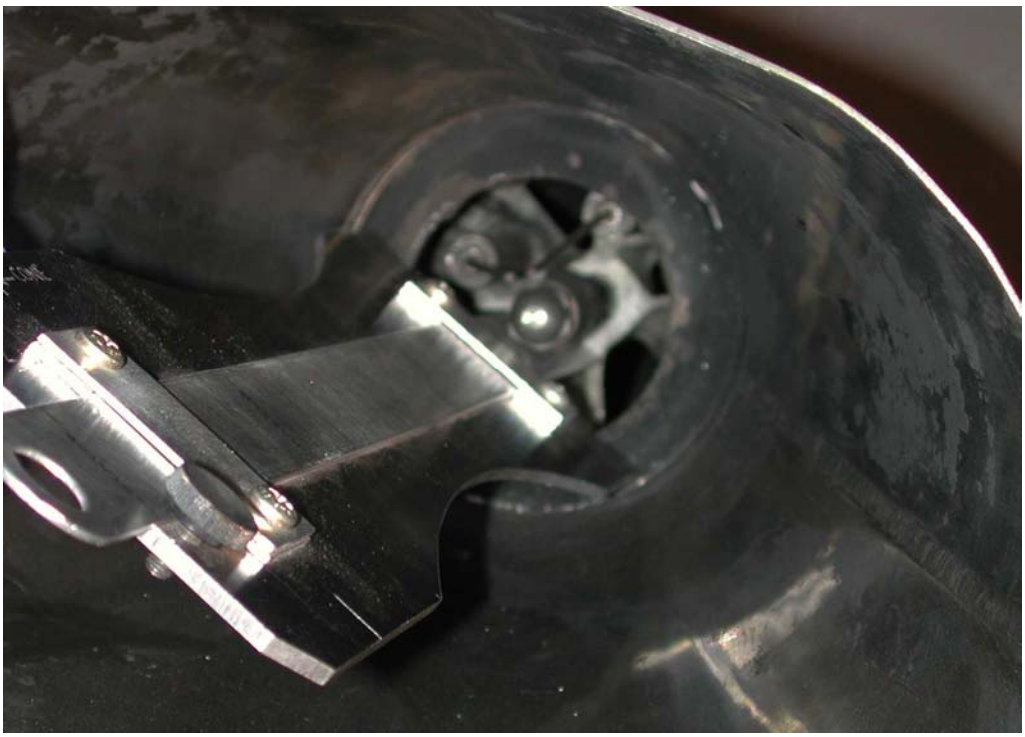

Figure 3: Setting Stator Depth

- Using dipstick, adjust ignitor depth. See Figure 4.

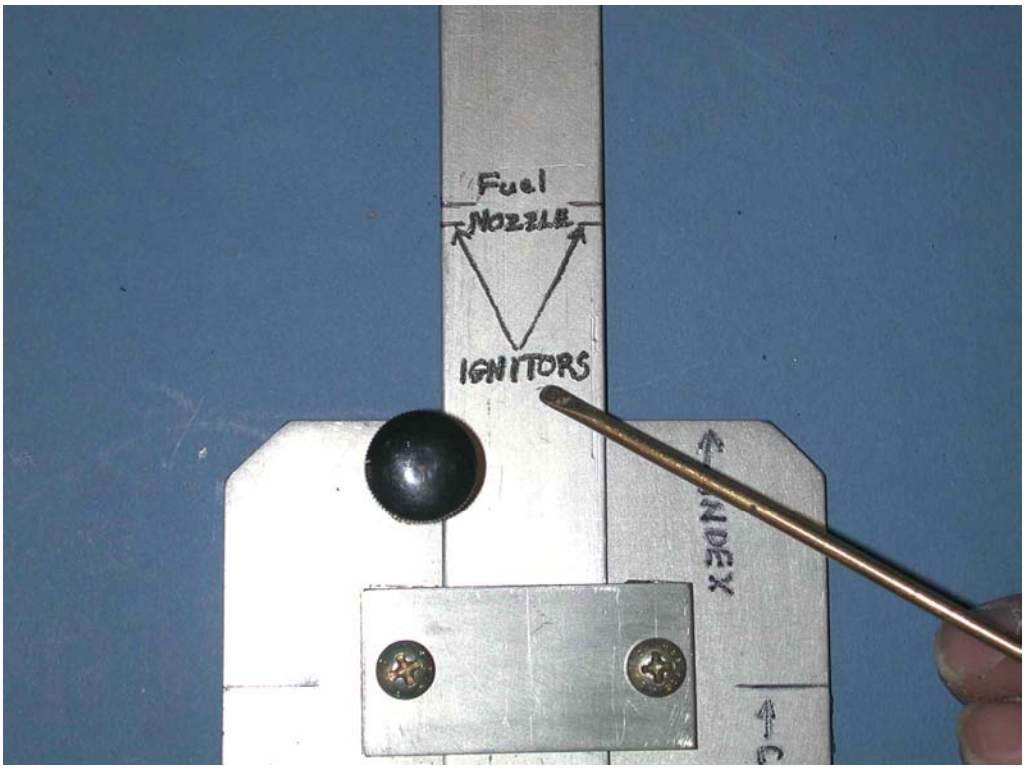

Figure 4: Ignitor Depth Mark

- Center burner faceplate over burner face using cam “ears”. Using silver pencil, transfer centerline from faceplate to burner cone.
- Level sample holder stand, paying particular attention to the horizontal stringer that is directly in line with the burner cone.
- Move burner to blanket burn position and check for height using bushing and pointer (see Figure 5). Pointer should hit center of target stringer.

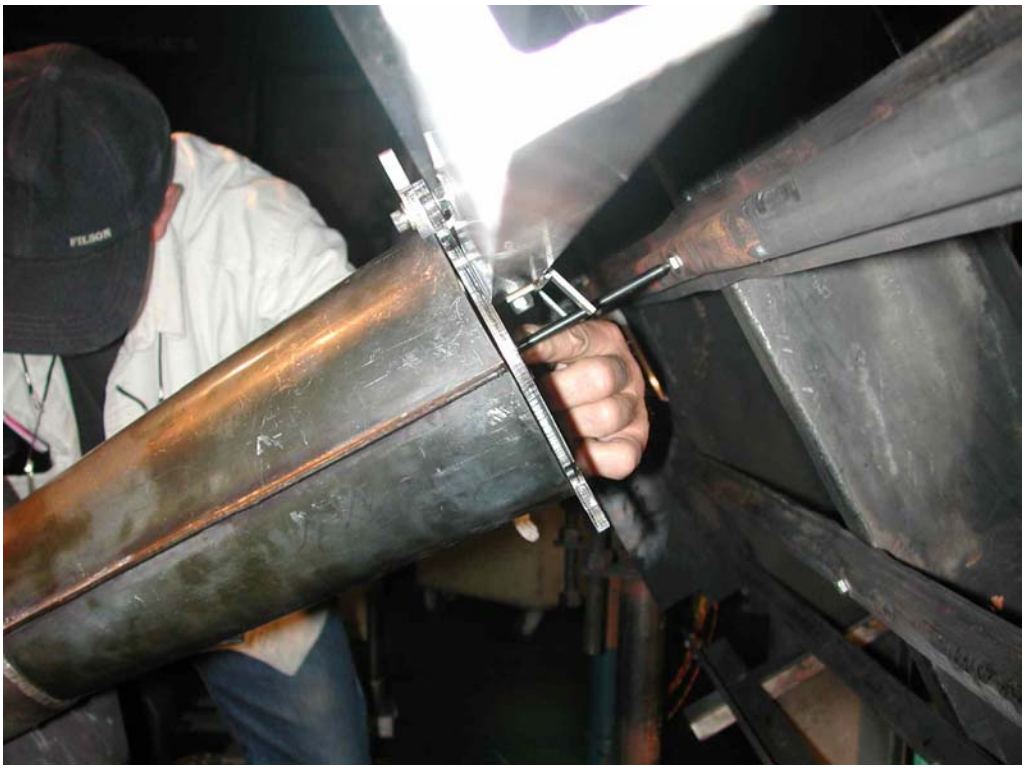

Figure 5: Setting Burner to Blanket Distance Using Bushing and Pointer

- Attach two 4-inch angle clips to burn frame on the outer formers, butting them up to the lower edge of target stringer. See Figure 6. Attach long angle to faceplate, and with centerlines of cone and faceplate aligned, distance to each angle clip should be equal as shown in Figure 7. Rotate burner cone until measurements are equal.

Figure 6: 4-inch Angles on Outer Formers

Figure 7: Measuring Vertical Distance to Centerline

- Measure from long angle to outer two formers and rotate the burner until the two measurements are equal as shown in Figure 8. These measurements should be 4-1/2 inches from faceplate side of angle.

Figure 8: Measuring Distance to Outer Formers

- Using center clip on faceplate dropdown tool as a guide, line up center of burner cone with the center of the long leg of the center former. See Figure 9.

Figure 9: Aligning Burner with Center Former Using Drop-Down Tool

Ignitor / Stator Clocking Tool (see Figure 10)

- Remove long angle and dropdown tool from faceplate.
- Insert long ignitor locator shaft over ignitors until bottomed out against stator.
- Install burner cone faceplate over shaft, again aligning the index marks.
- Install pointer knob on end of shaft; read ignitor clocking in clockwise degrees.
- Adjust stator to $325^{o} \pm 5^{o}$. Note: any adjustment of the stator will require removal of the draft tube/cone assembly. Clearly mark the position of the draft tube prior to removal, so that the draft tube can be re-installed in the correct position.

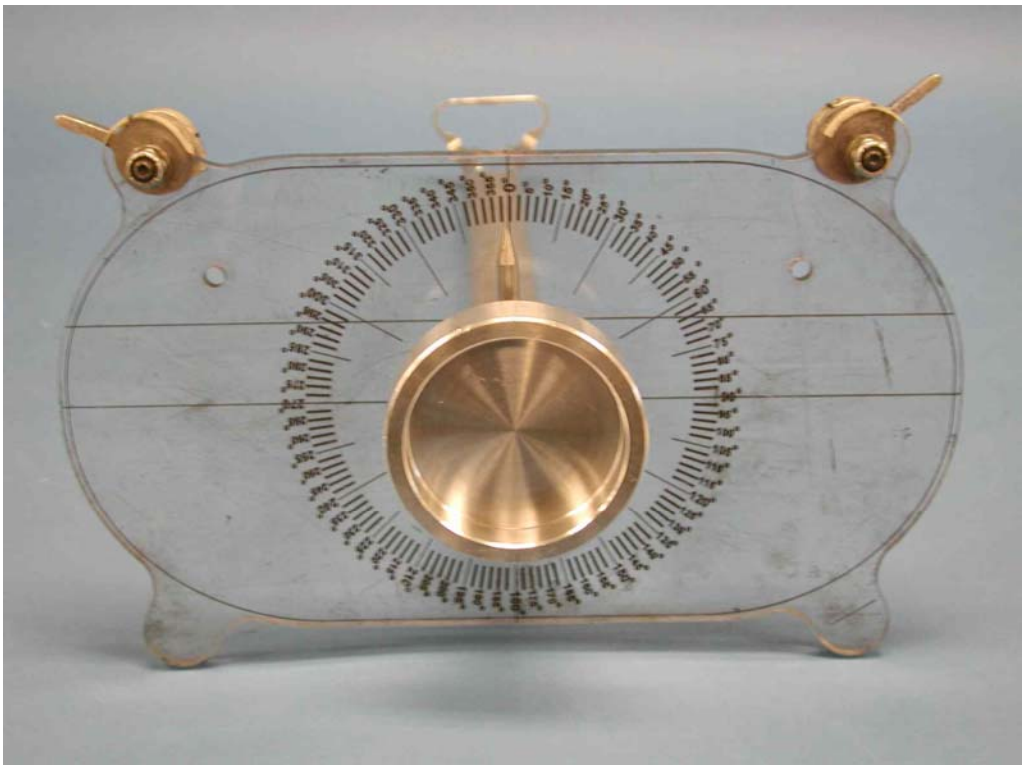

Figure 10: Ignitor / Stator Clocking Tool

Turbulator Clocking Tool (see Figure 11)

- Insert short ignitor locator shaft over ignitors until bottomed out against stator.
- Install turbulator clocking tool over shaft. Maneuver pilot plate (on face of disc) into center of turbulator and rotate until tab drops into corresponding notch on edge of turbulator.
- Install pointer and read location; clockwise from "0" is considered positive.
- Squeeze handle to clamp and rotate turbulator to desired position.
- Adjust turbulator to $12.5^{o} \pm 2.5^{o}$ (positive). Note: notch should be approximately in the 6 o'clock position. Apply silicone sealant to temporarily secure the turbulator in the draft tube, to prevent unwanted rotation.

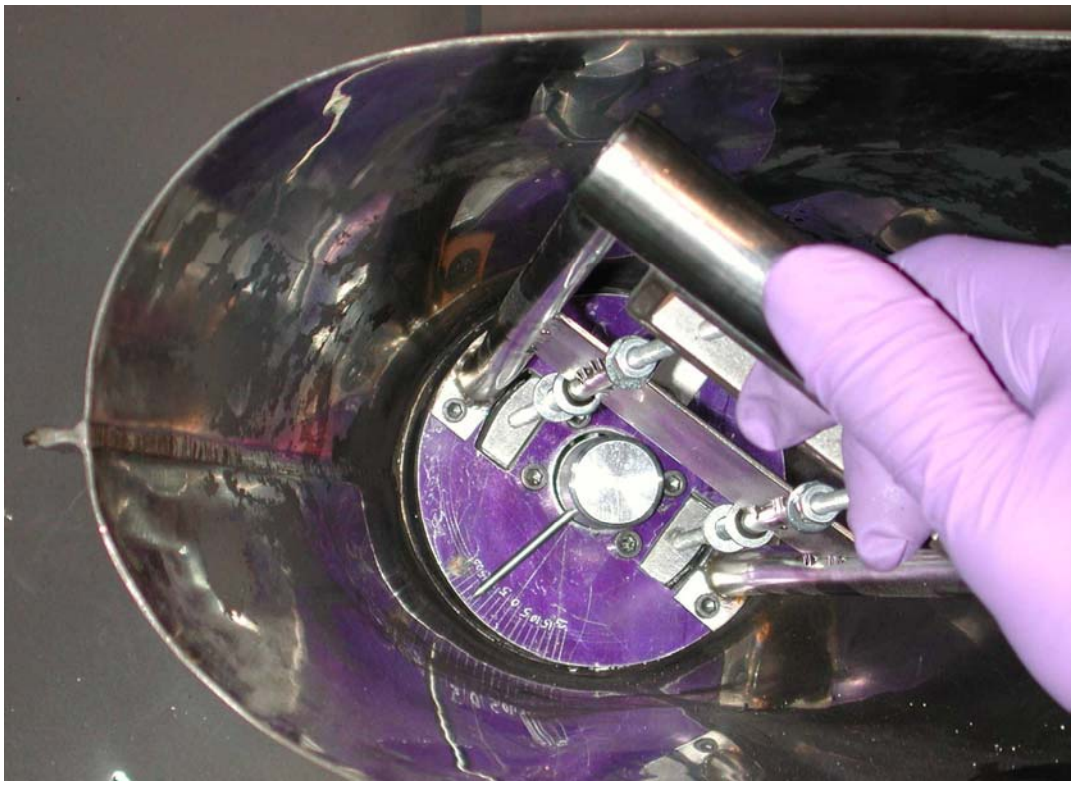

Figure 11: Turbulator Clocking Tool

Rake Setup (see Figure 12)

- Locate burner cone faceplate to index mark on burner cone.
- Flip down rake / calorimeter locator.
- The centerline of the thermocouple tips should just contact lower corner of drop-down tool at the appropriate witness lines.
- Adjust thermocouples accordingly.

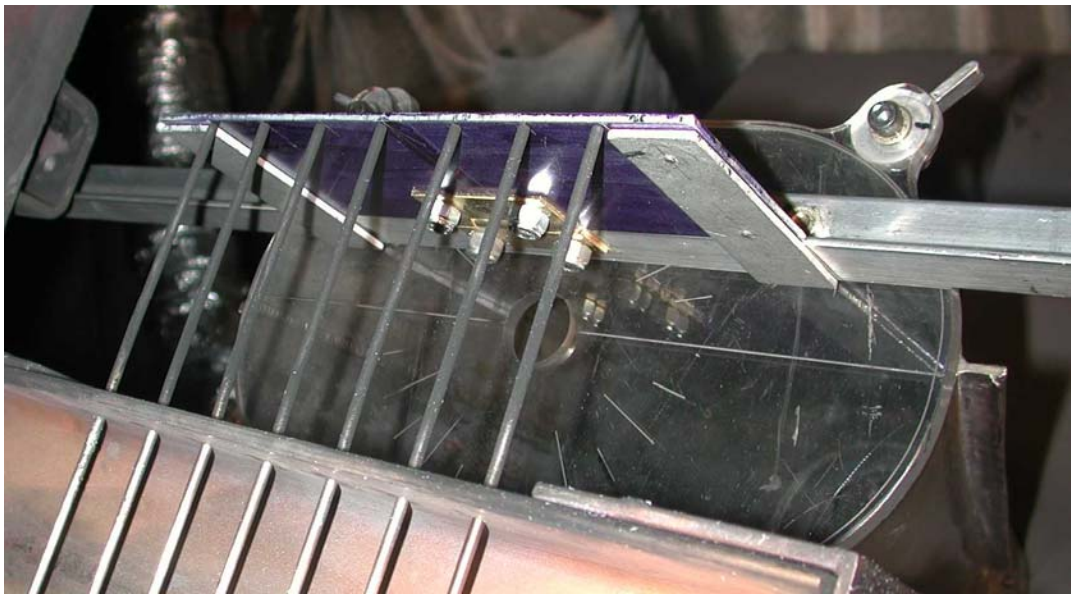

Figure 12: Setting Thermocouple Rake Using Drop-Down Tool

Calorimeter (see Figure 13)

- Locate burner cone faceplate to index mark on burner cone.
- Flip down rake / calorimeter locator.
- The edge of the drop-down tool should all but contact the calorimeter surface plane. The two witness lines, each ½ inches off of center, should line up with the outer diameter of the calorimeter. The upper, centermost corner of the center clip should be flush and tangent to the top of the calorimeter diameter.
- Adjust calorimeter accordingly.

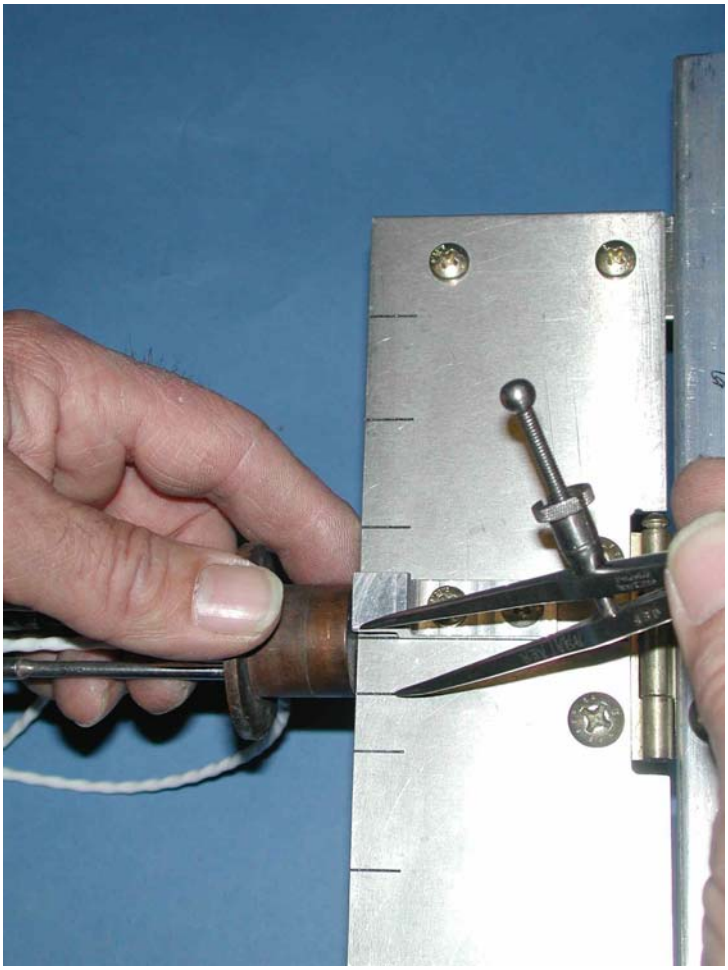

Figure 13: Aligning Calorimeter Using Witness Marks on Drop-Down Tool